COLLEGE : PSG INSTITUTE OF TECHNOLOGY AND APPLIED RESEARCH NEELAMBUR

TEAM LEVATHIAN (----AURO CODERS-----)

SACHIN RAM E S:

----->Expert in front-end and Android web development and Combines leadership qualities and presentation skills

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----->Front-end specialist and problem solver and A natural leader with strong presentation skills

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----->Database management expert and strong analytical thinking and problem-solving skillS.

QUBITRON

TECHNOVA

THE ULTIMATE TECH HACKATHON

Multi-Modal AI Support for Disabilities

AI & Computer Vision-based assistive system	Uses advanced AI and computer vision technologies to aid communication
Solves communication barriers for disabilities	Designed to assist individuals with various impairments.
Supports visual, auditory, speech, and motor impairments	Helps people with different types of disabilities communicate effectively.
Enables seamless real-time interaction	Ensures smooth and instant communication.
Addresses communication challenges for people with disabilities	Offers a solution tailored to those with speech and motor difficulties.
Uses AI, Computer Vision, and Assistive Technologies	integrates various cutting-edge technologies to enhance accessibility.
Enables interaction through speech, text, motion, and eye-tracking	Empowers individuals with disabilities to communicate independently.

AI-Powered Assistive Communication System

Millions of individuals worldwide experience speech, hearing, and motor impairments, significantly hindering their ability to communicate effectively. This project aims to develop an AI-powered, cost-effective, and user-friendly solution that enables seamless, hands-free communication for individuals with disabilities.

Proposed Solution

Leveraging advanced computer vision, machine learning, and natural language processing (NLP), our system provides an intelligent and efficient communication platform. The key features include:

- ☑ **Eye-Tracking Virtual Keyboard** – Utilizes OpenCV and MediaPipe to track eye movement, allowing paralyzed individuals to input text by widening their eyes.
- ☑ **Lip-Reading with AI** – Employs MediaPipe Face Mesh and LSTM (Long Short-Term Memory) models to analyze lip movements and predict words in real time.
- ☑ **Speech-to-Text (STT) & Text-to-Speech (TTS)** – Converts speech into text for the hearing-impaired and text into speech for the visually impaired, enhancing accessibility.
- ☑ **Real-Time Word Prediction** – AI-driven word suggestions accelerate text input, improving communication efficiency.
- ☑ **Facial Gesture Communication** – Recognizes predefined facial expressions to select words or phrases, providing an intuitive and alternative input method.

TECHNOLOGIES USED:

COMPUTER VISION & AI:

- ✓ **Google MediaPipe – Face tracking, lip movement detection**
- ✓ **OpenCV – Image processing**
- ✓ **LSTM (Long Short-Term Memory) Networks – Lip reading & predictive text**

MOBILE APP DEVELOPMENT:

- ✓ Android Studio – App development
- ✓ Java – Backend development

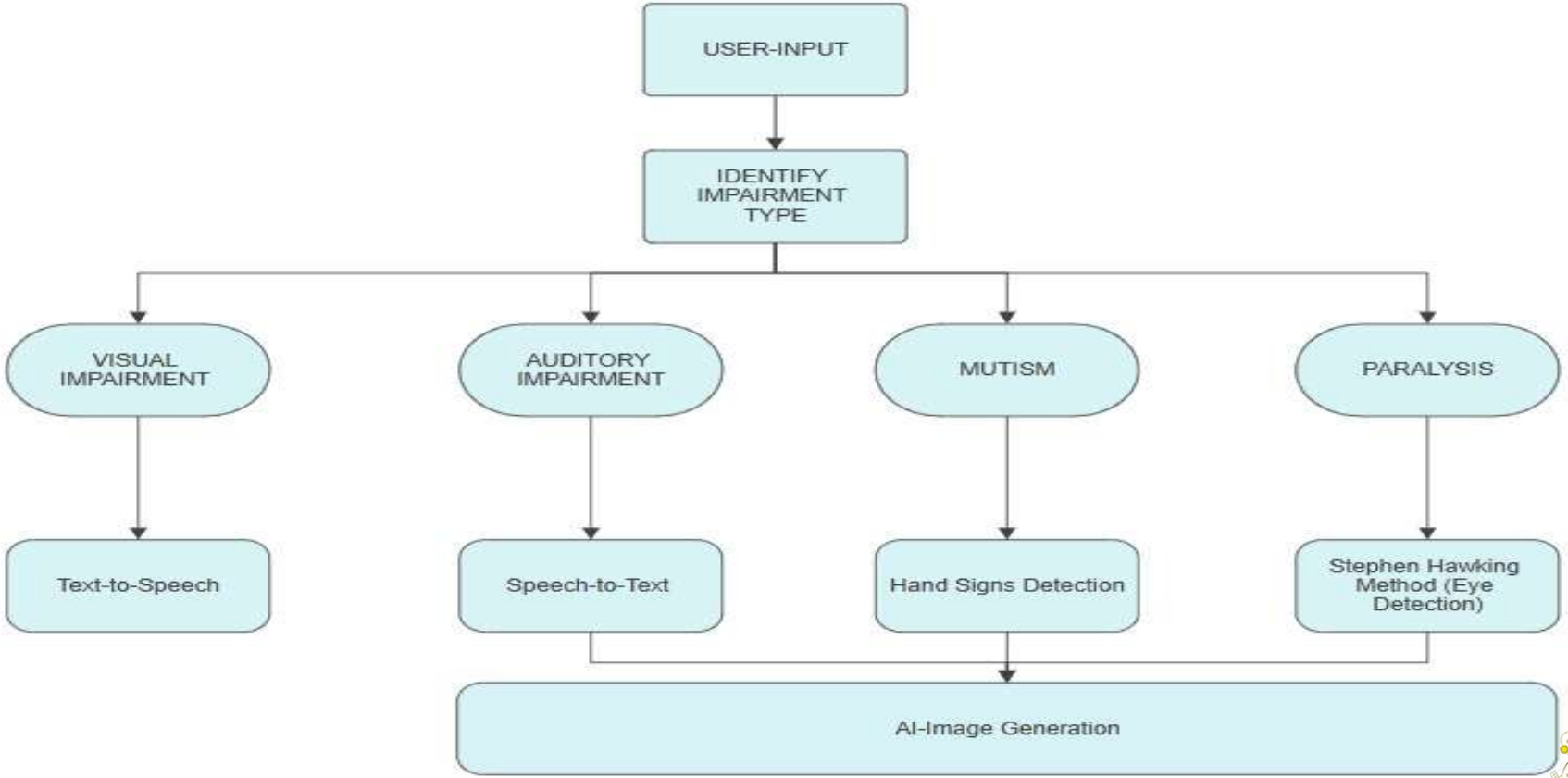
SPEECH PROCESSING:

- ✓ Google Speech-to-Text API – Converts speech to text
- ✓ Android Text-to-Speech (TTS) – Reads text aloud for visually impaired users

ASSISTIVE TECHNOLOGIES:

- ✓ Custom Eye-Tracking Virtual Keyboard – Enables text input using eye movements
- ✓ AI-based Word Prediction – Speeds up communication

Multi-Modal AI Support for Disabilities



Achievable Benefits

Increased Accessibility: Enables individuals with disabilities to communicate independently.
Real-Time Interaction: Fast speech and text processing for seamless communication.
Personalized AI: Machine learning enhances word prediction, reducing input effort.
Scalability: Supports gesture recognition, AI models, and multilingual capabilities.

Future Scope

Multilingual & Context-Aware AI: Expanding speech and text support with intelligent predictions.
Advanced Lip-Reading AI: Enhancing silent communication using deep learning.
Gesture & Emotion Recognition: Improving non-verbal interaction through facial tracking.
IoT Integration: Enabling smart home automation with eye-tracking and gestures.
Cross-Platform Compatibility: Extending support to iOS, web, and desktop.
Hardware Optimization: Enhancing performance for low-end devices.

This AI-powered solution ensures inclusive communication for individuals with disabilities.

THANK YOU !!!!

We aim to create a real impact with our AI-powered assistive communication system.

We focus on affordability, efficiency, and accessibility to maximize inclusivity,create a practical and scalable impact.

We look forward to your support in bringing this vision to life.
Thank you for this opportunity!